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EXAMINER

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/831,393
Filing Date: August 20, 2001
Appellant(s): YOVICHIN ET AL.

Roger D. Emerson
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed April 26, 2004.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is accurate but it is believed important to also point out the described function and reasoning behind the thickness selections for the contoured innerliner – i.e. note particularly page 8, lines 11-18 of the specification which set forth:

“The tire assembly 94 is then cured and removed from(sic) the mold 90 in the form of a completed tire. During this process, the innerliner 50 is stretched to its final toroidal shape. Because center region 70 is subjected to the greatest amount of stretch, the center region 70 is initially at least twice as thick as the lateral regions 72,74. For large nominal rim sized pneumatic tires for earthmover or farm vehicles, the center region 70 of innerliner 50 may exhibit greater than 100% stretch in diameter in the shaping and vulcanizing mold. In the finally shaped tire, the innerliner 50 exhibits nearly a uniform thickness throughout.”

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

Appellant's brief includes a statement that claims in two groupings, namely I: claims 1 and 3-5; and II: claim 10, do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

US 4,166,883	Seiberling	9-1979
GB 2,224,031	Uniroyal	4-1990
US 4,065,338	Mirtain	12-1977
US 4,089,360	Böhm	5-1978

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-8 and 10 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Seiberling (US 4,166,883) or GB 2224031 to Uniroyal taken in view of Mirtain (US 4,065,338) and/or Böhm (US 4,089,360).

The present claims fundamentally are directed to forming an innerliner¹ for tires (1) in precured form, this described in the specification as being to "eliminate the need for an inflatable bladder in an associated tire forming and vulcanizing mold" (page 6, lines 29-31 of the specification), and (2) to have a cross-sectional profile with a center region having a maximum thickness at least twice the thickness of a minimum thickness

¹ An "innerliner" is a standard/typical tire component normally located as the innermost layer of the tire, formed from a rubber material with a low air permeability, and whose function is to maintain tire pressure.

in a lateral region, this being described in the specification as accounting for the greater stretch to which the center region is subjected during toroidal shaping (note page 8, lines 11-18 of the specification).

Both Seiberling '883² (e.g. note col. 2, line 56 – col. 3, line 49) and GB '031 (note esp. page 3, lines 13-24) suggest providing the innerliner for a tire in precured form so as to eliminate the need for a curing bladder. These references do not however provide any specific teaching with regard to the cross-sectional profile for the innerliner and thus they do not suggest a cross-sectional profile with thicker central region. It however is known in this art to be desirable to provide a tire innerliner with a thickened central region to avoid the thinning of the innerliner than occurs with shaping of the tire to toroidal form, this further allowing the liner to overall use less material than otherwise would be required if the entire innerliner were thickened – note Mirtain (note esp. col. 1, lines 21-27 & 40-46; col. 2, lines 1-14; col. 4, lines 35-54; and figs. 10-14) as well as Böhm (esp. col. 3, lines 18+). As such, to form a precured innerliner to have a profile with thickened center region would have been obvious and lead to only the expected results – namely the ability to both avoid the need for a curing bladder (due to use of a precured innerliner) while also accounting for the stretch and expected thinning of the innerliner with toroidal shaping in a manner that avoids the need to thicken the entire innerliner (due to contouring the innerliner with a thickened center region). Although it is noted that the liner in Mirtain is uncured rather than precured, the simple geometric realities of an increasing circumference when shaping to toroidal form are present

² It is noted that appellants' also refer to this patent at page 2, lines 1-7 of the specification.

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regardless of the cure state of the innerliner and it is considered that the artisan would have expected the solution taught by the reference (selective thickening) to also suitably provide the desired results regardless of the cure state of the liner. The Böhm reference further supports this finding insofar as it provides a liner that is in important part precured, as well as contoured, to avoid these same thinning problems (e.g. col. 3, lines 18+; col. 8, lines 32+). To form a liner in such contoured form that is also precured would therefore have been obvious for the clearly expected advantage of avoiding the thinning of the liner, this also enabling the use of less overall material since a thicker than necessary overall thickness layer need not be used.

The particular degree of thickness variation would have been a variable whose optimum value would have been readily and routinely determined by the artisan dictated by the desire to have an overall even thickness in the final product. The claimed thickness variation would therefore have been obvious and lead to only the expected results, it being stressed that appellant apparently desires the same final result (i.e. "uniform thickness" in the final tire – note page 8, lines 17-18 of the specification) and thus the artisan would be expected to arrive at similar values for this result effective variable. In other words, with respect to the thickness variation, the references are considered to provide clear guidance to the artisan - namely to thicken the liner corresponding to the amount of thinning that will occur - this thickness variation however simply reflects the relative circumferences in expanded versus unexpanded states, as would have been readily apparent, and thus the parameters would have clearly and certainly been chosen *based upon the simple geometric relationships present in such a*

shaping process. Since this is the same goal as appellant, the artisan would thus have been expected to arrive at the same thickness variation relationships as appellant for this result effective variable, the desired result being the counteracting of the liner thinning with toroidal shaping.

The claims also define that the strip having the desired cross-sectional profile is formed using calendering means and that a press with contoured press platen is used to cure the innerliner. Calendaring to form the desired cross-sectional profile of the innerliner is however specifically suggested by Mirtain (col. 4, lines 55+) as well as Böhm (col. 6, lines 39-40). Such would render obvious use of calendering means to form the contoured cross-sectional profile. As to curing the innerliner, both primary references suggest precuring the innerliner before assembly into a tire (e.g. col. 3, lines 8-11, 41-42 and col. 4, lines 28-30 of Seiberling; page 3, lines 13-15 of GB '031). Further, these curing methods including "usual methods of curing" in Seiberling (note esp. col. 4, lines 16-31) and including cure by "conventional means" in GB '031 (page 3, lines 1-3). The artisan would thus clearly have been taught or motivated to adopt the well known and conventional means to cure rubber sheets, it being *extremely* well known per se in general to use a curing press (i.e. with two adjacent press platens, etc.) to cure rubber sheets (it being noted that appellants have not challenged this well known statement), use of such extremely well known and conventional means being obvious. As to the platen configuration, insofar as it is considered to have been obvious to utilize a profiled liner (for reasons already noted above), it is submitted that it would have been readily apparent to the artisan that the platens should be appropriately

shaped to the desired shape of the liner. In other words, if one were trying to mold/cure a certain shape material, they typically would be expected to use a cure press with platens that are of the desired shape. Thus, in modifying the conventional press cure to precuring such a contoured liner (as taught by the primary references in order to enable bladderless cure), it is submitted that it would have been readily apparent to the artisan that the platens should be appropriately shaped to the desired shape of the liner. For example, when one is trying to cure a green tire in a curing press, the press is obviously shaped to the desired shape of the article being cured, as would have been readily apparent to the artisan. None but the expected results would thus be achieved.

Claims 1 and 10 also define that the portion of the innerliner that is cured has a length that is equal to or greater than a surface of the building drum upon which the liner will be wound. Seiberling '883 as well GB '031, as noted above, suggest precuring the liner prior to building into the tire (i.e. prior to application to the tire building drum); further, since these references would have been read as requiring a completely cured innerliner (otherwise, the whole point to having a cured innerliner would be lost), this would have been understood as requiring that the liner be cured over at least the circumferential length of the drum. The alternative, namely curing some smaller length, would obviously leave some part of the liner uncured, which would clearly be seen to have been inconsistent with the teachings of the references with regard to the use of a cured innerliner to avoid the need for a curing bag. As to in-line curing, since continuous materials are being formed (calendering being of course a continuous formation process) and must be cured, the artisan would have readily appreciated that

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there are really only two options - they can be either cured in-line or in two entirely separate processes/devices, the particular choice being well within the selection of the artisan based upon readily apparent concerns such as space and tooling considerations in a manufacturing plant – only the expected results would follow either selection.

Forming/joining splice surfaces for the precured material would also have been understood as the natural, obvious and necessary manner to build any tire layer (e.g. note col. 3, lines 29+ of Seiberling as well as col. 5, lines 6-10 of Mirtain), it further being considered that the particular splice angle (claim 4) would have been selected based upon well known considerations, it being again considered to have been well known per se in this art that higher splice angles lead to expected improvements in the bond due the larger area of contact (it being noted that appellants have not challenged this well known statement). Rolling up stock material prior to use (claim 3) represents a standard and very typical manufacturing expedient, and would therefore have been obvious. Use of adhesive (claim 5), if necessary, would have been obvious to the artisan in this art recognizing that cured layers no longer have the green tack that normally helps hold materials together – note also col. 4, lines 18-20 of Seiberling provides evidence of this understanding in this art of the known need for adhesive in tire building when cured materials are used.

(11) Response to Argument

Appellants argue that “there is no basis to combine Seiberling or Uniroyal with Mirtain and/or Böhm to arrive at the present invention”, it being argued first that Seiberling does not teach forming a profiled innerliner and curing it with a profiled platen

as claimed. It is not disputed that Seiberling does not suggest profiling the liner (and thus profiling the curing means). However, it is again noted that the primary references clearly suggest precuring the innerliner before assembly with the tire, the secondary references providing a very strong motivation to profile the liner so that it is thicker at the central areas. It is also urged that

“Additionally, Seiberling does not teach or suggest a method of providing the predetermined portion having a length equal to or greater than a circumference of said associated tire building drum; winding the predetermined portion onto said associated tire building drum *after* the step of utilizing the curing means; cutting the predetermined portion to provide splice surfaces after the step of utilizing the curing means; and, forming the pre-cured innerliner by joining said splice surfaces.” (emphasis in original).

For reasons amply advanced within the statement of rejection above, however, it is submitted that these steps are taught/obvious. To summarize, Seiberling clearly suggests curing the liner prior to tire building (e.g. col. 3, lines 8-11 as well as other places) and thus the tire building (i.e. winding on the drum, splicing, etc.) certainly would have been understood as occurring after curing. Further, again, if the artisan didn't cure a length equal or greater than the drum circumference, this would obviously leave uncured liner portions, a result that certainly is completely at odds with the Seiberling teachings to provide a cured innerliner to avoid the need for a curing bladder and appellants have provided no convincing line of argument to refute this. With respect to Uniroyal (GB '031), it is argued that “[t]here is no teaching or suggestion of a method for using a press to in-line cure an innerliner in order to preserve the claimed predetermined cross-sectional shape.” While it is agreed that Uniroyal does not suggest forming a contoured liner, such teachings are provided by the secondary

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references as already noted. Further, again GB '031 clearly suggests curing the layer as a separate layer (page 3, lines 13-15), use of a curing press with contoured platen being obvious for reasons detailed in the statement of rejection above.

It is also argued that Mirtain is directed to an uncured liner. This is also not disputed. However, this reference provides clear evidence of an understanding by the artisan of a known problem in tire building - namely the fact that when a built tire is shaped to toroidal form, a uniform liner must of necessity become thinner towards the crown because of the simple fact that the diameter/circumference of the material is increasing with toroidal shaping (e.g. note col. 1, lines 21-27 and 40-46 of Mirtain). While it is agreed that this reference was not concerned with trying to provide a bladderless cure and thus only describes the more conventional uncured liner, it is again submitted that the ordinary artisan would have appreciated that the problem of thinning of the liner would be present regardless of whether the liner is uncured or precured and appellant has provided no convincing line of reasoning to show otherwise. In other words, the simple geometric realities of an increasing circumference when shaping to toroidal form are present regardless of the cure state of the innerliner and it is considered that the artisan would have expected the solution taught by the reference (selective thickening) to also suitably provide the desired results regardless of the cure state of the liner. The Böhm reference further supports this finding insofar as it provides a liner that is in important part precured, as well as contoured, to avoid these same thinning problems (e.g. col. 3, lines 18+; col. 8, lines 32+). To form a liner in such contoured form would therefore have been obvious for the clearly expected advantage

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of avoiding the thinning of the liner, this also enabling the use of less overall material since a thicker than necessary overall thickness layer need not be used.

It is also urged that Mirtain '338 teaches away from preserving the profile as it smoothes out the profile with curing. The curing referenced in Mirtain is however in reference to the final curing of the tire, *not* precuring of the liner. Further, the smoothing referred to in this patent is with reference to the grooves that can be provided on the bladder surface for air evacuation when against a curing bladder. These grooves are however expressly identified as optional in Mirtain (note reference to "with or without venting passageways" at col. 5, lines 34-39 as well as "may" at col. 2, lines 15+). Further, the teachings with regard to the grooves would have been understood as separate and distinct from the teachings with regard to profiling the liner, it being noted that the problem being addressed by the grooves is expressly identified as essentially separate and distinct from the problem addressed by the contoured liner – note esp. col. 1, lines 12-27 as well as col. 3, lines 60+ and col. 4, lines 35+. Thus, this reference still clearly evidences an understanding in this art of the geometrical realities facing the artisan during the final shaping/cure of a tire and provides a solution, namely selective thickening of the liner at the central region to avoid the inevitable thinning. The teachings to optionally pattern the liner for air evacuation against the bladder, which pattern apparently becomes smoothed out in the final cure, does not take away from the teachings with regard to the overall profile desired of a liner. In other words, it is considered that the artisan would have understood that the patterning teachings would obviously be unnecessary if curing is effected without a bladder (as taught/enabled by

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the primary references). This again however is also not considered to take away from or be inconsistent with the teachings with respect to the liner contour.

Appellants also point to the selective curing of layers in Böhm. Böhm however was applied principally as additional evidence of the known thickening of a central liner part to avoid thinning during shaping - these geometric realities are present regardless of the state of the cure of the liner. Further, Böhm was applied also as additional evidence of a reasonable expectation that a contoured liner would suitably function to yield the desired results even if precured (it being noted that the uncured strips are provided only for bonding reasons). Further, and in any event, again, the artisan would have been expected to understand and expect a contoured liner to suitably function to avoid thinning regardless of the cure state thereof - the geometric realities are present in either case as would be readily apparent. With respect to claims 3-5, note the statement of rejection.

With respect to the argument that all claim limitations must be present (argument "2"), note again the statement of rejection where it is again submitted that all of the claim limitations would have been obvious to the ordinary artisan in light of the applied prior art. With respect to argument "3" pertaining to Mirtain and the smoothing/ironing of the ribs, note the above discussion with respect to the smoothing in Mirtain. As to Argument "4" that the laminate in Böhm is cured after incorporating in the tire, it should first be noted that the teaching for precuring a liner prior to incorporating in a tire is found in the primary references. Böhm was applied principally as additional evidence of an understanding of the known geometric realities for innerliners and the known use of

a contoured liner to avoid these problems. Further, Böhm was also applied as providing additional evidence of a reasonable expectation that the contoured liner would suitably function to yield the desired results even if precured (it being noted that the uncured strips are provided only for bonding reasons). Further, appellant has provided no conclusive line of argument that would show that the artisan would have found that the geometric teachings in Böhm would have been seen to have been fundamentally inconsistent or inapplicable to a precured liner, these teachings in fact seemingly tending to show the opposite as already noted.

It is also argued (argument "5") that the references do not provide guidance on selecting the thickness variation and that the rejection is based upon obvious to try. This argument is unconvincing as the references are considered to provide clear guidance to the artisan - namely to thicken the liner corresponding to the amount of thinning that will occur - this thickness variation thus simply reflects the relative circumferences in expanded versus unexpanded states, as would have been readily apparent, and thus the parameters would have clearly and certainly been chosen based upon the simple geometric relationships present in such a shaping process. Since this is the same goal as appellant, the artisan would thus have been expected to arrive at the same thickness variation relationships as appellant for this result effective variable, the desired result being the counteracting of the liner thinning with toroidal shaping.

The arguments presented as argument "B" on page 11 of appellants' brief have also been considered but they essentially track previous arguments that have already been addressed above, reference being made to the comments above and in the

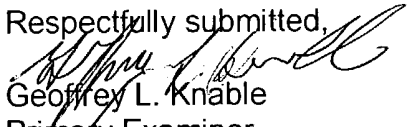
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statement of rejection. It is noted that appellants also refer to a "claim 23" on page 11.

It has been assumed that this is in reference to claim 10 as there is no claim 23.

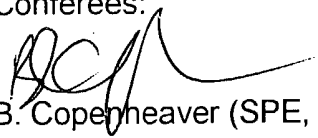
For the above reasons, it is believed that the rejections should be sustained.


Respectfully submitted,


Geoffrey L. Knable
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July 11, 2004

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